The treatment is operation. Usually trephine openings, with drainage of the hematoma, is sufficient. Occasionally, it will be necessary to turn down an osteoplastic flap. One must also remember that they are not infrequently bilateral.

Blast Injuries:

Although there are many unanswered questions relative to blast injuries, certain facts have been fairly-well established, both clinically and experimentally.

Individuals in close proximity to an explosion, either in air or water, may be killed or seriously injured from the effects of the externally applied pressure wave.

The most common lesions are found in the lungs and gastro-intestinal tract. Lesions are also found in the brain, spinal cord, liver, spleen and kidneys. Air blasts are more likely to produce serious lung lesions, whereas water blasts tend to produce lesions of the intra-abdominal organs. However, serious lung and intestinal lesions may occur with both types of blast injuries.

The pulmonary lesions are bilateral, and vary from alveolar damage and rupture, with capillary bleeding into the smaller bronchioles, to extensive injury and destruction of the large portions of lung tissue, with occlusion of large bronchi with blood clots. Pulmonary edema may occur later in varying degrees.

Two types of lesions are met with in the gastro-intestinal tract, namely, contusions and hemorrhage of the bowel wall and perforations. Experimentally, these changes are in direct proportion to the amount of gas in the lumen; and this explains why lesions are more common in the large bowel. Lacerations and contusions of the liver, spleen, and kidneys have been described, but are rare and not seen when normal experimental animals are exposed to blast injuries.

Petechial hemorrhages in the brain and spinal cord have been described by numerous writers. These patients suffer from headache, loss of memory, personality changes, irritability, motor weakness and convulsions.

Treatment:

Persons who have been close to exploding bombs, even if they show no evidence of injury, require observation for twenty-four hours.

Shock is common in these cases, must be looked for, and properly treated if it occurs. Providing the patient's condition permits, x-rays should be taken of chest and abdomen.

The treatment of the chest injuries will be essentially symptomratic: absolute bed rest, sedatives, and oxygen administration for respiratory embarrassment. Pulmonary edema may require hypertonic solutions and vena section. If pneumonia develops, appropriate sulfa-therapy is indicated.

The treatment of intraabdominal injuries will require careful judgment, especially since these casualties also have, as a rule, definite lung pathology. The perforation of a viscus is the one indication for immediate surgical intervention. This diagnosis is rather difficult to make unless the x-ray films of abdomen show the presence of free-air in the peritoneal cavity, or unless there is evidence of spreading perintonitis. When perforation or peritonitis is suspected, continuous gastric suction by the Wangensteen or similar apparatus should be instituted immediately, and continued after operation. The anesthetic, in view of the lung pathology, is local, supplemented by pentothal sodium if necessary.

The therapy of the central nervous system lesions is the same as indicated in cerebral concussion and contusions, because, as stated, petechial hemorrhages scattered throughout the brain are the common lesions.

If cerebral symptoms continue, or especially if they become more marked, the possibility of subdural collection of fluid must be considered; and if diagnostic procedures indicate their presence, trephine and drainage should be carried out.

909 Hyde Street.

THE HOSPITAL: IN EMERGENCY MEDICAL SERVICE*

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SINCE December 7, 1941, the hospitals in the State of California have been undergoing an extensive preparation to defend their plants against damage by fire or enemy bombs. During the same time, they have been carrying on extensive plans for the organization of the personnel, so that they might be prepared to receive large numbers of casualties for treatment within their walls. The interest in the above two programs has increased and waned in keeping with our successes and failures in the Pacific. At the present time, interest in not only hospital protection, but in all types of civilian defense has reached a very low ebb, and it is with much effort on the part of committees that the program is kept alive. It would not be correct to say that the effort of the past many months has been without value, for in a State where natural disaster has previously occurred with much destruction of life and property, any review of our disaster plans is extremely valuable. Many points have been learned from the program to date.

FIRE PROTECTION

Since the outbreak of the war, all buildings have been reviewed for fire equipment. Attics have been cleaned out and roofs have been made more accessible. Perhaps for the first time in many years, fire extinguishers have been completely rechecked and refilled; auxiliary fire fighting apparatus and trucks have been established

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* One of several papers in a Symposium on "Emergency Medical Service in Wartime." Papers collected by Henry Gibbons, III.

From the office of the Superintendent, Stanford University Hospitals.

in every hospital. Hospital personnel have become better acquainted with their neighborhood fire stations and fire-station personnel.

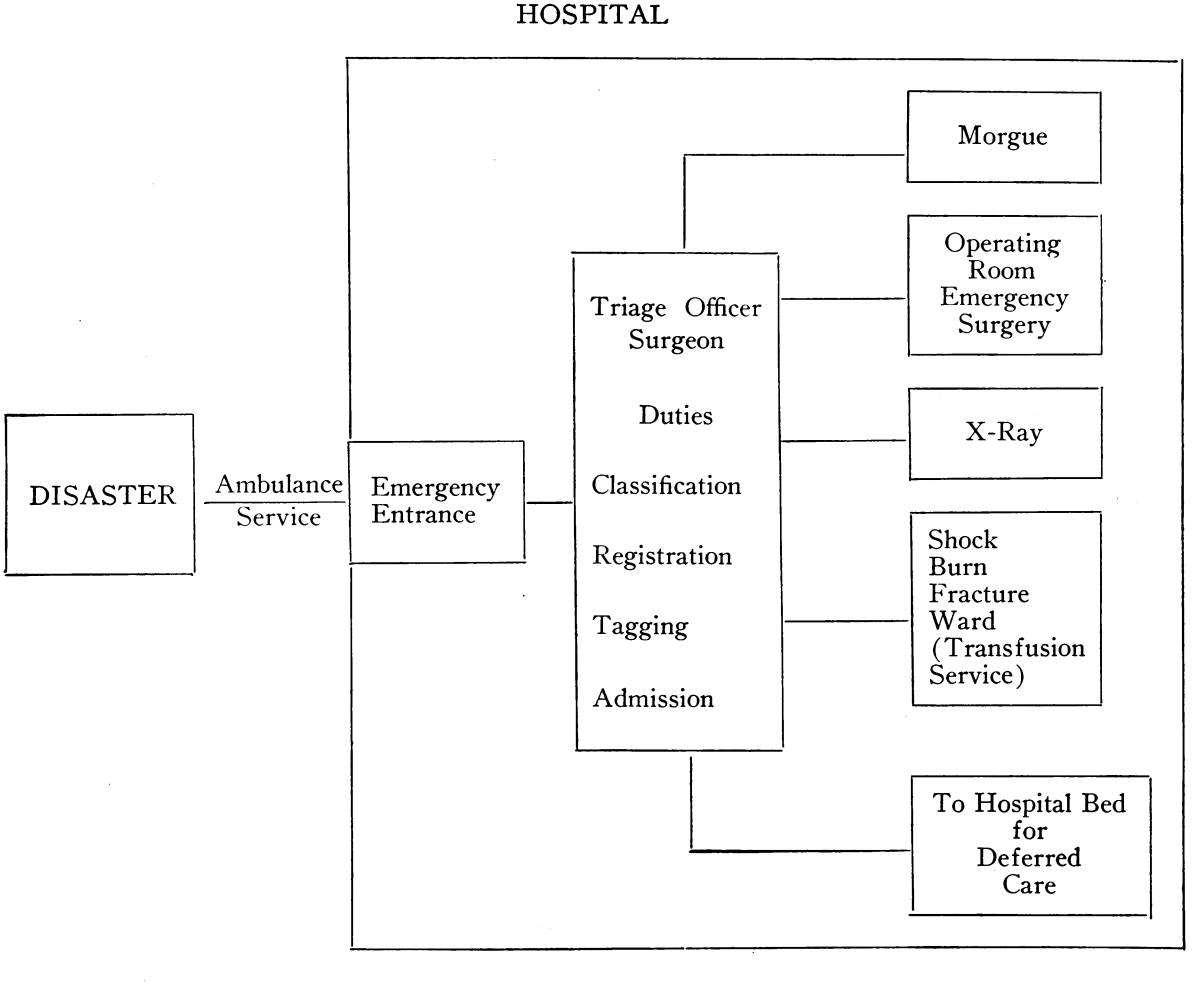
EMERGENCY EQUIPMENT

For the first time during the life of hospital administrators, they have given thought to the possibility of great numbers of admissions in a short period. To handle such a problem, they have organized emergency equipment and have looked for space to expand. At first thought, hospital administrators did not think it possible to devise, even on paper, ways and means whereby hospital capacities could be greatly enlarged. However, upon closer scrutiny, it was seen that class rooms, auditoriums, sun porches and waiting rooms could be quickly converted to temporary wards. It was also realized that existing wards could have their capacities increased and private rooms could be easily doubled. To take care of that expansion, much emergency equipment was obtained from the office of Civilian Defense, the American Red Cross and from the hospital's own supply. Thinking along this line has been of exceptional value, and, as we have seen in certain catastrophes which have arisen in this country from causes other than enemy action, the possibility of great demands for hospital beds may be a reality at any time.

PERSONNEL

The organization of the civilian hospital in peacetime does not call for anything similar to military organization. It was soon realized that a peacetime organization could not function during the time of disaster, and hospital staffs were quickly organized on a military type basis with a single commanding officer and his assisting staff. Transportation of personnel to the hospital during blackouts gave us considerable concern. At the same time, it prompted us to develop house-staff organization of nurses and physicians living at the hospital. Such organizations have been in existence since the early days of the war and, it is felt, will function if called upon to do so. As in peacetime, it was necessary for us to develop specialization programs, and, with this thought in mind, Mobile Medical Teams, Gas Decontamination Squads, Shock and Burn Teams, Transfusion Teams and many other specialization groups were organized, trained and equipped. A skilled surgeon is stationed at the hospital entrance to act as Triage officer. It has been very comforting to observe the ingenuity of our physi-

TABLE 1.—*Diagrammatic Outline to Indicate Arrangements in a Hospital, for Care of Persons Injured in a Local Catastrophe or Bombing*



cians in devising emergency type equipment and methods.

REHEARSALS

Perhaps the most important functions in morale building and training for disaster have been the rehearsals which have been held. Many lessons were learned in connection with rehearsals. The following seem to me to be the most important:

(1) Rehearsals can be used as a morale-building factor. No other part of our defense program within the hospital seemed to stimulate the enthusiasm and support of the personnel. The publishing of bulletins, and the isolated instances of demonstration, failed to create the needed enthusiasm.

(2) It was evident that all employees of the hospital should participate in some way in order that each might feel a part of the functional unit. This was easily made possible by thought on the part of the Rehearsal Committee.

(3) A sufficient number of casualties should be available and, in my opinion, a sufficient number is 15 more casualties than could possibly be handled with the entire staff on duty, and all equipment available. In earlier rehearsals where only a few victims were admitted, most of the staff did not have an opportunity to work actively. Consequently, they went away feeling that there was too much "make-believe." On the contrary, in those rehearsals where everybody worked, and there was much more than could be done, they went away with the feeling that they had actively participated in a real program.

(4) Activation of all departments should be insured by the proper direction on the tags of the victims. An important point which was learned early in the war was the fact that physicians do not need practice in diagnosis since that is their life's work, and they are participating in that type of activity daily in their routine work. It was evident that we needed practice in traffic management and interdepartmental relationships. In order to carry out this idea, all casualties should be tagged with instructions which will direct them to a specific department, so that the work will be evenly distributed and everyone will be busy.

(5) Casualties should be admitted in such order that all departments will start working as early as possible during rehearsal. This was accomplished by first admitting a patient to the x-ray department; secondly, a patient needing a transfusion; thirdly, a woman in labor for the maternity division; fourth, a patient who needed surgical treatment in the operating room; fifth, an hysterical patient admitted to the psychiatric ward; sixth, a child in diabetic coma to the pediatric ward, etc. In this way, there was no idle time during the first half hour of the rehearsal.

(6) It is very desirable to have a specific point at which time all activities will cease regardless of at what stage the department is functioning.

(7) It is very desirable to have a meeting of all those who have participated in the disaster rehearsal. This meeting should not be a post-mortem of the rehearsal, since frequently unrest and dissatisfaction on the part of a few may be contagious and make others discontented. I strongly advise holding such post-mortems in small groups in specific departments. In this way, the surgical division can review its program regarding shock and burns by itself, etc. I believe that the general meeting should be a morale-building meeting, and the time should be given over to two or three speakers who have some interesting message regarding war effort. It is always amazing to see, collected in one auditorium, the number of people who have participated in a rehearsal, as during the rehearsal this group is spread around the hospital so many places that no one realizes the great number who are functioning during the program. The accompanying diagrammatic sketch shows the arrangement of a hospital for the care of the injured that would come from a local catastrophe or bombing.

SUMMARY

We, of California, can be very grateful for the many points we have learned, and the experience we have had since Pearl Harbor. I am sure that the hospitals and their personnel will be better prepared to meet a disaster of enemy action, sabotage or natural forces because of the concentrated thought we have given the subject during the past months.

Clay and Webster Streets.

SHOCK*

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THE best treatment for shock is prevention. The guiding principle should be early recognition of impending or primary shock, and its early treatment, and thus the prevention of secondary shock. Accepting these premises, it is not difficult to realize the importance of early symptoms. British experience indicates that 20 to 30 per cent of air raid casualties suffer from severe injuries and associated shock. If deaths are to be prevented, it is necessary to treat prophylactically all patients suffering from injuries which may produce shock, rather than wait until classical signs develop before therapy is instituted.

PRIMARY SHOCK

Primary shock due to neurogenic and psychogenic influences follows quickly after receipt of trauma and, unless complicated by loss of blood or other shock-producing factors, is of short duration. The characteristic circulatory change is vasodilation. Sweating, relatively warm skin, low-blood pressure, feeble and usually slow pulse and syncope are the characteristic findings. First aid

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* One of several papers in a Symposium on "Emergency Medical Service in Wartime." Papers collected by Henry Gibbons, III.

Generous use of material and text from O.C.D. publication 2212 was made, as per Reference I.